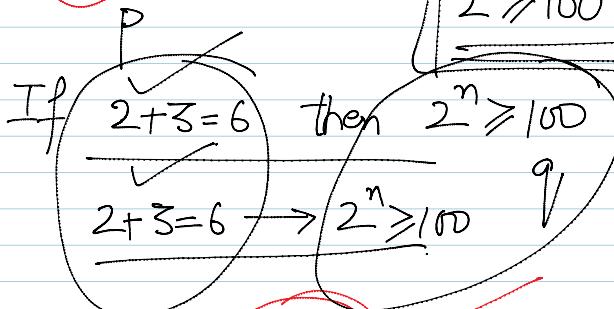
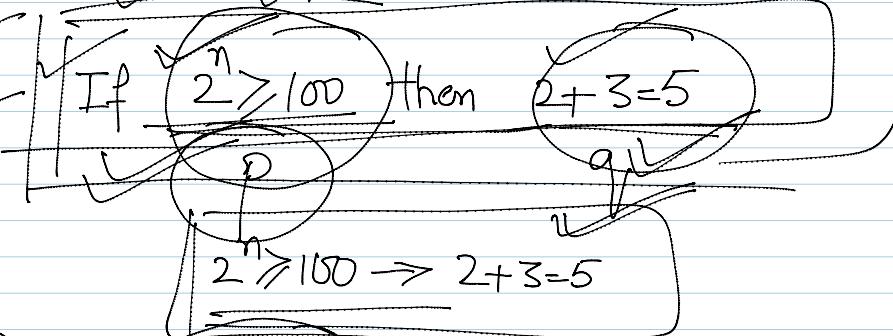


Conditional statement

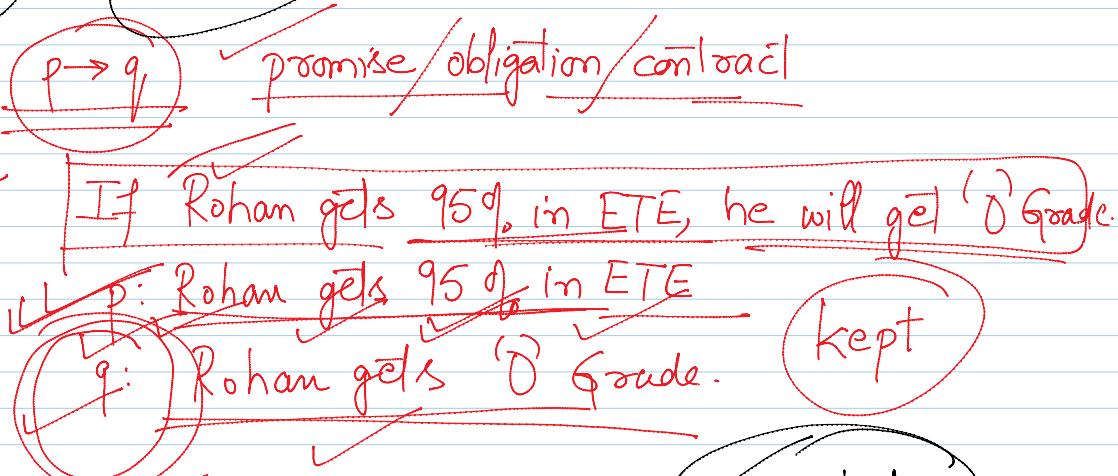
$(P \rightarrow q)$ false if ' p ' is True & ' q ' is False
otherwise is True.

P	q	$P \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

If ' p ' then ' q '



p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T



A true prop. can imply a true prop. only!
----- can't || || False.

and but

The statement $p \rightarrow q$ is called a conditional statement because $p \rightarrow q$ asserts that q is true on the condition that p holds. A conditional statement is also called an implication.

The truth table for the conditional statement $p \rightarrow q$ is shown in Table 5. Note that the statement $p \rightarrow q$ is true when both p and q are true and when p is false (no matter what truth value q has).

Because conditional statements play such an essential role in mathematical reasoning, a variety of terminology is used to express $p \rightarrow q$. You will encounter most if not all of the following ways to express this conditional statement:

"if p , then q "

" p implies q "

p : $f(x)$ is diff. able

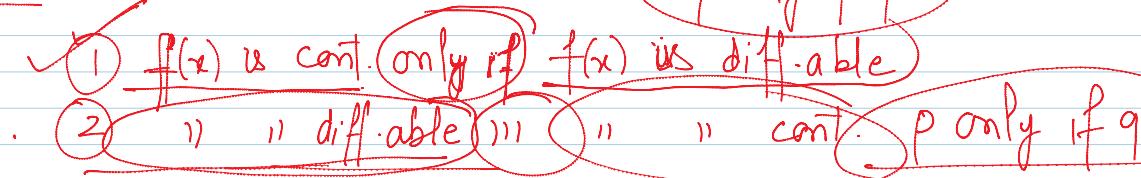
q : $f(x)$ is cont.

$$f(x) = |x| \text{ at } x=0$$

following ways to express this conditional statement:

- "if p , then q "
 - "if p, q "
 - " p is sufficient for q "
 - " q if p "
 - " q when p "
 - "a necessary condition for p is q "
 - " q unless $\neg p$ "
- " p implies q "
 - " p only if q "
 - "a sufficient condition for q is p "
 - " q whenever p "
 - " q is necessary for p "
 - " q follows from p "

$$P \rightarrow q$$
$$f(x) = |x| \text{ at } x=0$$



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- ① Differentiability is Necessary for continuity
- ② Continuity is not necessary for differentiability

P : $f(x)$ is diff. able.

q : 1) \Rightarrow cont.

Good.
 $f(x)$ is diff. able when/whenever
 $f(x)$ is cont. diff. able.